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Abstract: The paper concentrates on tools and technologies used for participatory processes in the context of sustainable urban planning and design. The paper aim is to explore and present how some recent tools and technologies are used to inform policies, strategies or overarching concepts for engaging stakeholders to work toward a common vision for change in their community. The capabilities of Scotland's Place Standard tool, BREEAM-Communities assessment tool and the Smart City technologies that enable co-production in urban planning and design are analysed through literature review.

The *Aktivniy Grazhdanin*, a citizen engagement portal was established to devolve decision-making on aspects of Moscow's smart city programme to citizens, provides a case study on the potential use of Smart City technologies to solicit citizens' views on the city management and transformation.

The paper discusses the impact of those tools and technologies in terms of supporting place-based collaboration, citizen engagement and participation, and their value to providing for an open and iterative design process. The research highlights the strengths and weaknesses of the analysed tools and technologies. In conclusion the paper makes recommendations as to how frameworks can best be shaped by such tools in order to achieve local ownership, and provide structure to a more inclusive development and sustainable urban design. Finally, the paper gives a high-level indication as to the next stage of planned research.

Key words: social innovation frameworks, engagement tools, smart city technologies

Introduction

Across the developed world, behaviours to govern actors involved in spatial development in order to safeguard public assets and community cohesion have changed (Wainwright, 2014). Often planners have sought solutions to society's ills - poverty and ill-health - through the development process, placing their faith in the bricks and mortar of buildings (Jacobs, 1961), sometimes ignoring the root causes of social deprivation in order to respond to shifting short-termist public policy context at the time of urban development planning (Finger, 2018; Greenfield, 2017). Sustainable urban planning and design are increasingly dependent on social innovation, a term given to a variety of methodologies, tools and processes that support a multidisciplinary approach to urban transformation. By definition, social innovation is something that is collaborative - meaning that it requires input from a number of (often isolated) actors, sectors, domains or knowledge areas working together towards a common goal. Taking a hypothesis that social innovation occurs over phases of the network, framework and architecture (Horgan and Dimitrijevic, 2018), this paper examines how collective approaches to urban design can inform more holistic policy development and inclusive growth. The idea of social innovation, defined as novel ideas that meet a social challenge (Manzini, 2014; Murray et al, 2010), can help us look outside of the established, sometimes restricted domains of single professions. Bria (2015) conducted a far-reaching study to extensively document global social innovation initiatives, concluding that while there is an ever-increasing transdisciplinary movement of actors across technology and civil society

collaborating on solutions to social challenges, more needs to be done to coordinate these actions and understand their implication for policy making and urban development.

Already two decades ago, discourse on sustainability in urban planning and design has brought into question the notion of adaptation for sustainability by asking whether we should be trying to sustain a status quo in situations or scenarios where the established modus operandi is no longer 'fit for purpose' (Marcuse, 1998). This is particularly relevant in the field of the built environment, given the lack of innovation in design, practice and materiality (Johar, n.d.) and the fact that the construction industry remains the biggest global polluter after agriculture (Circle Economy and ABN AMRO, 2017). To support the internationally agreed UN Sustainable Development Goals (SDGs) (United Nations, 2015), new holistic models – frameworks consisting of focused policies and local structures - are required to assist co-production of scalable solutions that can be open and agile enough to generate ownership amongst a diverse group of stakeholders - evoking alternative pathways to urban development.

A networked based approach (Monbiot, 2017) is novel in the way that it makes best use out of pools of common resource, knowledge and experience - and uses advancements in technology to channel knowledge exchange, distributed decision-making and governance (Kitchin 2018; 2014). In an empirical investigation of social innovation initiatives for sustainable urban development, Angelidou and Psaltoglou (2017:115) found the link between social innovation and sustainable development to be "very pronounced" owing to the challenges that contemporary urban settlements face and their position as "places where urban futures and the knowledge and innovation economy come together". Their investigation puts social innovation for sustainable urban development in two "clusters of literature", one concerned with "the role of citizens and their communities" and a second one concerned with "socio-technical transitions, focusing on the process and involved actors in social innovation" (Angelidou and Psaltoglou, 2017:115). They identified four types of citizen profiles in the sustainability discourse: the 'citizen sensor', the 'sharing citizen', 'the collaborative citizen' and 'the entrepreneurial citizen', where citizens can have dual or multiple roles "depending on the situation" (Angelidou and Psaltoglou, 2017:122).

The global financial crisis in 2008 has acted as a driver of the relentless pace of technological innovation where the low costs of computing hardware has given rise to ubiquitous technology - with sensors and data collectors embedded across our public realm and private spaces creating an 'Internet of Things' (Greenfield, 2017; Ash et al, 2018; Kitchin, 2018; 2014). The increased capabilities to collect data have given rise to the era of Big Data (Kitchin, 2014) where complex data sets, comprising information modelled from new data sources, converge to produce a sophisticated real-time evidence base for decision-making (Kitchin, 2018). Technology-led, big-data approaches to city management often fall under the domain of the smart city, a paradigm that has emerged in the past decade as an umbrella term for seeing technology as a panacea to right the intractable problems of society (Greenfield, 2017; Hollands, 2008).

Contemporary approaches to sustainable urban planning and design recognise the importance of developing place-based frameworks for development that take holistic social, economic and environmental factors into consideration. A framework, in the context of this paper, encompasses the policy and the structures that may enable sustainable community (renewal) transformation to take place. Such frameworks are needed because for too long, many in the built environment professions - motivated by questionable ethical positions - have worked too closely with commercial actors, facilitating unsustainable development that has exacerbated inequality and encouraged rampant gentrification (Hollands, 2008). In recent years this close relationship, between architects and developers in particular has left many questioning the role of the contemporary architect and their value to modern society (Wainwright, 2014). Over the decades, participatory design in architecture has often been tokenistic, or occurring too late in the design phase to affect decisions that impact communities (Oliver and Pearl, 2018). Authorities and local governments have often produced plans or strategies that focus exclusively on economic growth as a pathway out of inequity, working towards KPIs and quantitative outcomes that mask multiple indices of social deprivation and structural poverty that cause communities to decline and require regeneration (Greenfield, 2017). Planners are destined to repeat the mistakes of the past - slum clearances that produce peripheral ghettos - without a set of new tools and processes that can help them work towards new collective social outcomes, common across a whole ecosystem of community agencies.

The impacts of globalisation - and the inequitable relationships between richer and poorer actors - are manifest in environmental, economic and social shocks experienced by communities worldwide. This investigation, which takes a global perspective, follows an ethnographic action research approach, engaging communities in participatory dialogue to build up a deeper understanding of the context for resilience. Research includes a number of international case studies from developed economies to the developing world and the global south, seeking to map commonalities in strategy and approach to adaptation. Cases have been selected based on their capacity for networked collaboration to develop open and agile frameworks for resilience planning. The case of Moscow, looks at how the smart city paradigm can provide an overarching mechanism to facilitate wider participation in urban development and change. The hypothesis that underpins this paper centres on three distinct phases of social innovation - network, framework and architecture - connected by feedback loops. Pathways towards developing frameworks for place-based decision-making are investigated by examining tools and technologies that have been used by community networks, local councils and other governance agencies, and the potential use of Smart City concept for participatory decision-making about urban development. Along with the literature review, a case study is included on *Aktivniy Grazhdanin*, a citizen engagement portal established to devolve decision-making on aspects of Moscow's development to citizens. The case study has been developed through action research, an ethnographic investigation alongside a literature review.

Tools and mechanisms used in place-based frameworks

Scotland's Place Standard Engagement Tool

UN Sustainable Development Goals (SDGs) (UN, 2015) are translated into overarching national policies used by local agencies to develop specific targeted and contextual local development strategies. In the case of Scotland, the UN SDGs have informed Scotland's SDGs (Scottish Council for Voluntary Organisations, 2018), expressed as vision statements in Scotland's National Outcomes (Scottish Government, 2018) and Scotland's Third National Planning Framework (Scottish Government, 2014). These policies are supported by legislation under the Scottish Government's Public Engagement and Consultation, Community Empowerment Scotland Act (2015) (Scottish Government, 2015) and set against National Standards for Community Engagement (Scottish Government, 2016) which mandate a level of community engagement and participation on development projects. In response, tools such as the Place Standard have emerged as a method to engage citizens to assess their settlements and prioritise local goals aligned to overarching global and national sustainable development policies.

The Place Standard tool, developed with planners and architects in Scotland, "lets communities, public agencies, voluntary groups and others find those aspects of a place that need to be targeted to improve people's health, wellbeing and quality of life" (Place Standard). It provides "a simple framework to structure conversations about place" and takes a long-term view of sustainability, encompassing a number of domains - including local economy, public transport, housing - allowing distinct and separate organisations to work together productively. Along with economic and spatial aspects, it has been designed to consider social aspects - health, welfare, work and community.

The tool prompts discussion among stakeholders, helping to identify assets and resources within a community as well as challenges and areas for improvement. In Scotland, communities who are seeking to embark on a journey of regeneration or physical improvement are encouraged to use the Place Standard, often with the support of Planning Aid Scotland through workshops and charrettes (Planning Aid Scotland). By using the tool to interrogate project outcomes, development proposals are ideally more balanced, achieve community buy-in and generate ownership among stakeholders, resulting in a local development plan (LDP) - framework – once shared outcomes have been agreed in terms of a development approach. In this way, the Place Standard tool is part of a process, and not an end in itself. A report in 2017 listed 65 separate instances of Place Standard being used across Scotland between December 2015 and February 2017 - reaching over 11,000 citizens across 22 local authorities (Scottish Government, 2017). Overall the tool has been well-received as an aid in aligning ambitions within a community ecosystem, particularly within the context of community engagement, owing to its universality and ease of use. The report found that aligning the engagement process to strategic decision-making achieved most buy-in from stakeholders (Scottish Government, 2017).

This said however, as a tool with which to organise strategic actions, it requires further refinement. Managing and organising respondents' data can be resource intensive and ambiguity arises when using the tool over roles and responsibilities for individuals and organisations in taking forward actions (Scottish Government, 2017). A significant challenge identified through the Scottish Government evaluation was to ensure community engagement is representative of the whole population in a place and that future efforts seek to support engagement with those who are most marginalised and under-represented as a precursor for reducing inequality and promoting inclusive growth (Scottish Government, 2017).

BREEAM-Communities Assessment Tool

Building Research Establishment (BRE) has developed BREEAM-Communities (BREEAM-C) as a development assessment tool to help developers and private sector stakeholders to take sustainability concerns into account. It contains a compulsory consultation component in order to ensure the "needs, ideas and knowledge" of communities are taken into account during the detailed planning stage of a development (BRE, 2012). Community participation in BREEAM-C is required to certify the master planning process (Oliver and Pearl, 2018; BRE, 2012). The tool defines a number of domains and sets of indicators in order to assess the quality of design in terms of the social, economic and environmental impacts of development on a community. BREEAM-C, however, is primarily envisaged to help a design team engage with sustainability issues in the early design phase of a development project.

Oliver and Pearl (2018) looked at how the BREEAM-C tool was used by the developer of a large mixed-use new build project at Masthusen in the Swedish city of Malmö, focusing on its role in facilitating community consultation and participation. The study found the tool to be limited, "as a certification tool used solely by the developer, as opposed to a tool that could bring together the City of Malmö, community groups and the developer in a synergistic project" meaning that it was "limited to focusing on achieving sustainability outcomes within the boundaries of its site" (Oliver and Pearl, 2018:PAGE). The study found that the tool, which focuses on product outcomes in the design process, "had a limited impact on empowering the immediate and surrounding communities and creating a synergistic, integrated design with its surroundings" (Oliver and Pearl, 2018:PAGE). This was owing to the fact that tool was said to employ a "limited definition of community", and was employed too late in the process, meaning that consultation had no impact on the design (Oliver and Pearl, 2018:PAGE). These observations point to the need to engage communities early in the design process – with community focused tools like the Place Standard, and to use these to facilitate a common vision or strategic mechanism for development across an ecosystem of competing stakeholder positions (developer, local government and community).

The Smart City Collaboration Mechanisms: Approaches and concerns

The Smart City concept emerged in the early 2000s as a means for collecting data by using sensors, Information and Communication Technologies (ICT) and Internet of Things platforms

that can inform better management of cities' services. It has been aggressively marketed by technology companies to cash-strapped city governments since the financial crash in 2008 (Greenfield, 2017; Kitchin, 2015; Kitchin et al, 2015; Hollands, 2015; 2008). While there is no agreed discrete definition as to what the concept refers to exactly (Angelidou et al, 2017), there is a broad consensus that a smart city uses innovation in ICT as a means for achieving sustainable development, social innovation and improvement (Angelidou et al, 2017). Taking a systems-thinking approach to the Smart City, Caputo and Evangelista (2018) highlight that the Smart City depends on two main factors: "continuously updated Big Data and Smart Technologies" and "customer willingness to cooperate on their development".

At an international policy level, environmental sustainability concerns are integral to the concept of the Smart City (Angelidou et al, 2017; Angelidou and Psaltoglou, 2017; European Commission) with many interventions focused on air quality and cleaner energy or transport solutions. Smart City solutions are adopted by many cities across the world as mechanisms for delivering community resilience through a focus on holistic social, economic and environmental outcomes (Angelidou et al, 2017). The Smart City provides a lens for looking at the city as a system (Saviano et al, 2016) on which to model scenarios and policy interventions; prototype and test new solutions; and deliver new social infrastructure.

Concerns regarding the Smart City paradigm as a key concept for sustainable development include questioning the motivation of global high-technology companies seeking partnerships with city governments (Hollands, 2008) and highlighting the dangers of seeing technology as a panacea to all ill-gotten urban problems (Hollands, 2015). Hollands (2015) refers to the work of Harvey (1989) and asks why the Smart City that is being promoted "can only be effectively delivered through a corporate vision of smartness, in conjunction with an entrepreneurial form of urban governance", shining light on the absence in urban sociology of "an alternative to the neo-liberal city, smart or otherwise" (Hollands, 2015:62), and highlighting the need for a "substantial shift in power from corporate business and entrepreneurial city leaders to ordinary people and communities" (Hollands, 2015:63).

The concept continues to be a significant means for informing better urban management and development, with research indicating about 250 smart city projects worldwide (Navigant Research, 2017) and figures from the European Commission suggesting 240 smart cities with populations over 100,000 (Euractiv). While ambitions remain high, concerns are mounting. Kitchin (2014) identifies five main concerns, particularly over the politics of data collection and data use; technocratic city governance and development; procurement and investment in technology and infrastructure; technological performance and security and how the city is viewed as a system. He sees engagement and participation with stakeholders as a way to counteract the emergence of a "panoptic city", and highlights that "without critical interrogations the smart cities of the future will likely reflect narrow corporate and state visions, rather than the desires of wider society" (Kitchin 2014:12).

Angelidou and Psaltoglou's (2017) analysis of nine smart city case studies leads to similar conclusions. Angelidou et al. (2017:80) found that corporate smart city visions are "increasingly driven by business imperatives", often misaligned with citizens' priorities -

facing opposition from the local population in the case of Barcelona and Songdo (Angelidou et al, 2017; March and Ribera-Fumaz, 2016). Looking to research from Luque-Ayala and Marvin and (2013), Angelidou et al (2017:80) found that corporate initiatives “fail to develop the capacity of a city’s people to actually learn and deeply engage in the smart city discourse resource” and that “citizen uptake and stakeholder resonance is critical... as citizens need not only be informed, but actively engaged in the co-design of the smart city solution” (Angelidou et al, 2017:88).

Viewing the criticisms by Kitchin (2014) and Angelidou et al (2017) alongside others, questions that persist regarding the Smart City concern relationships between stakeholders - public, private and community actors in the pursuit of what Kitchin (2014) refers to as ‘smart urbanism’ and include:

- Ownership - Who owns the (Big) data, proprietary softwares, innovation and strategy within the ecosystem?
- Governance - What roles, responsibilities, process and protocols are in place to facilitate collaboration and partnership?
- Participation - What is the quality of public engagement and how does it improve democratic decision making (around sustainable urban development)?

The above questions have been used in the case study presented below.

Case study: *Aktivniy Grazhdanin* and decision-making in Moscow, Russian Federation

The use of smart city technologies in Moscow provides a case study on an information-led mechanism for enabling citizens’ participation in decision-making in city management, urban planning and design. Action research – live semi-structured interviews with citizens in Moscow alongside conversations through internet channels and online groups inform this investigation. *Aktivniy Grazhdanin* (AG, Active Citizen) is a tool developed by the Moscow Smart City team to engage citizens around urban development proposals and change in their city. The platform facilitates citizen oversight and participation in planning decisions, primarily on issues relating to the upgrade of the public realm and public spaces, as well as getting feedback on local government proposals on smart city strategies and development policies. Developed to offset a top down approach to city planning, over 2,000,000 citizens have participated, representing between 10 and 20% of Moscow citizens (Holder, 2017).

Moscow is currently undergoing a large-scale programme of *renovatsiya* – or renovation – where poorly performing buildings are due to be demolished in favour of improved housing projects to be built on the periphery of the city (Alonso, 2018), which is set to affect more than two million citizens in Moscow over the next fifteen years (Holder, 2017). The theme of renovation is of great concern to a great many of citizens in Moscow, where private ownership is high owing to the change in economic systems (Krashenninokov, 2003).

Ownership

A majority of voting on AG takes place on the web platform, or mobile web application, yet there is also the possibility for informed citizens to vote at a *Moy Dokumenti* (My Documents), local public services centre in person. The “Our City” urban repair and development functionality has successfully engaged many citizens to use the platform (Murawski, 2018), part of which allows citizens to submit complaints relating to urban environmental issues. A consistent feedback loop where issues are responded to by the local government within a fixed time period of five days, results in a high rate of satisfaction. Two hundred streets have been improved or redeveloped through this function in addition to repairs and resolution of other issues. Detailed citizen profiles allows for geo-targeted polling, particularly around themes relating to renovation, where two thirds of citizens need to agree to demolition of a particular apartment block, according to the programme. This however has no basis in Russian law, which requires full consent of occupants before an apartment block is selected for demolition (Charley and Leslie, 2017).

A perceived lack of ownership is evident in cases where if no occupants of a block vote, that building is assumed to be compliant with demolition. In both online research and in interviews, respondents referred to the platform as “*Fiktivniy Grazhdanin*” (or fictitious citizen) owing to the lack of transparency around where ideas come from, the design of survey questions and the breakdown of voting results. In many cases there is no limit to the amount of times an individual can cast a vote on a particular issue. In conversation with the development team, it appears that the majority of ideas on AG come from within the local government system itself, while there is a separate ideas platform open for citizens with ideas for the city, What Moscow Wants (Moscow Mayor’s Office, 2018a). Interviewees referred to a case where voting on one issue (the renaming of a metro station) recorded ten votes every ten minutes consistently through the night which may suggest an automated programme was used to cast votes. In the context of voting around renovation or demolition (and displacement) however, further information is required to identify voters. Yet the perception that there is no real ownership over decision making on renovation in Moscow was common, with many seeing AG as a way to provide a veneer of compliance.

Governance

Moscow’s Smart City team (a function of the Mayor’s office) admits that local governance functions in a very top-down way. This team, however, emerged from a need to centralise information and communications technology systems so as to reduce duplication, incoherent procurement and public spending, deliver greater efficiency and reduce bureaucracy. This allows for a holistic view for planning for both public services and infrastructure. Ideas often come from the market, while specific government departments act as gatekeepers for ideas, that are then submitted to the team. Good ideas then undergo a proof of concept phase, before being presented to the mayor, and subsequently included on the AG platform, or not. During development of a large urban park (Zaryade), on a vacant site adjacent the Kremlin, citizens were polled on design concepts and spatial functions. In interviews however, respondents complained that it felt like AG was being used to facilitate already decided

procurement decisions, for instance around the removal and planting of trees in the city, or pavement installation. Many felt that while not overtly facilitating corruption, that AG represented a smokescreen of perceived openness around decision-making that was in fact only simulated.

With regard to renovation in particular, the ambiguity in Russian law around public ownership of property, owing to the change in economic systems presents unique difficulties. Effectively, private ownership of property in the case of mass housing extends only to the space of an apartment, meaning that the building fabric, envelope and environs remain effectively in state ownership (Semiletova, 2011). This allows for a situation where government, banks and development agencies keep a tight control over urban development and planning decisions. While a process does exist where citizens can achieve ownership of the (public) space which their building occupies, this involves a costly process where all apartment owners must agree to purchase the land together, employ a consultant who prepares a plan that must be accepted by the city authorities and included in the general plan for the city of Moscow (UNECE, 2004). This option is open to a truly limited number of citizens or communities (primarily due to the costs involved). In terms of the ability of citizens to influence wider urban development decisions effecting their local neighbourhood and the city of Moscow more generally, respondents felt that questions were designed in such a way as to encourage participants to select answers that would positively resonate with existing plans of the local government. A decision to establish an open-air museum at a site on Khokhlovskaya Square (Moscow Mayor's Office, 2018b) was cited as an example of this.

Participation

Additional systems provided by the Moscow local government to allow citizens to suggest proposals or ideas for the city are not effectively connected into AG. Respondents complained that invariably the type of ideas to be voted on the AG platform were of little consequence to the actual urban development in the city, and participation was often open to decisions that had very little impact. Examples cited included decisions around the colour of seats in the Luzhniki stadium refurbishment, or the choice of tiles in an improvement of the urban realm. Respondents were highly sceptical that alongside an option of "Yes" or "No", an option to "leave it to the experts" was also included, which was often the highest voted outcome in the case of important public realm decisions. This left citizens to feel that real participation in decision making was not possible around these issues. Citizens can earn points for participation in decision-making via AG platform (Moscow Mayor's Office, 2017) – which can be exchanged for Metro credit and other prizes – incentivises participation, in particular those from lower economic backgrounds, increasing the potential for manipulation.

While the AG platform allows for geo-targeted polling of citizens around renovation or demolition, this is seen as designed to simulate a perceived participation, where truly open and transparent decision-making was lacking. The wider socio-economic context in Moscow, which remains the centre of economic activity in Russia, is an important consideration when looking at the context of public participation. Respondents noted the importance of the

construction industry in a difficult economic context of sanctions, as a factor in the urban development processes. This is perhaps evident in cases where buildings in good condition, occupying high value land are chosen for demolition, and others in a far worse condition in undesirable parts of the city are ignored. While there are clear advantages to urban development in engaging through online systems such as AG, these should not replace traditional forms of face-to-face engagement. This can be particularly difficult in a Russia, where policy exists to prohibit certain forms of public organisation or protest. More research needs to be done comparing hard data with decision-making outcomes to truly assess the value – transparency and openness - of the *Aktivniy Grazhdanin* platform.

Conclusions

One of the most novel aspects of the research approach is the international perspective, of particular importance as the intractable challenges that face communities are increasingly multifaceted and global in nature. The doctoral study comprises a number of case studies, selected for their socially innovative qualities, and investigated along a common pathway of deeply ethnographic action research. Relationships built up through dialogue with communities on the ground in Moscow, Christchurch and elsewhere, will form the basis of subsequent research inquiries through surveys and other mechanisms, in order to make comparative studies across the cases. Taking discussions with citizen and local government stakeholders on *Aktivniy Grazhdanin* into account, alongside the literature review into Smart City technology-led engagement more widely, it is clear that major concerns exist around ownership, governance and participation. While technology provides cheap and effective ways to engage citizens around issues that have little material impact on their day to day lives and future resilience, when decision-making is required on large issues such as renovation or displacement, there is no substitute for offline face-to-face engagement in a real-world context. In Scotland, this ambition is emphasised in the Scottish Government's commitments to public engagement through the planning acts and charrette programme. In the context of Moscow, which is considered to be a world leader in facilitating urban development and socio-economic resilience for citizens through its Smart City programme (facilitated through *Aktivniy Grazhdanin*), the use of technology to sanction neo-liberal planning and construction processes is of great concern. More research and deeper ethnographic studies are required to better understand the impact and outcomes for citizens under the process of renovations and demolition. In particular, this should concentrate on the risks to maintain community resilience (alongside the ethics around acquiring private assets by displacement), and where truly socially innovative tools or actions could support citizens.

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